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Titre

[E3][td1] Serie N°2
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Type

Exercices

Ecole

FST Tanger

Classe

MIPCI

Matière

Chimie minérale

Professeur

Année univ

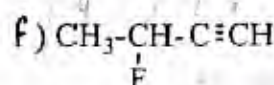
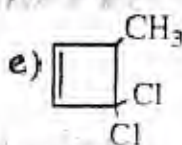
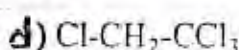
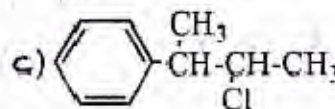
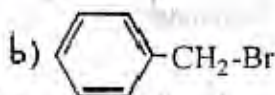
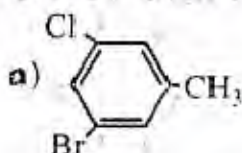
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Travaux dirigés – Module C121 Chimie Organique

Série 2

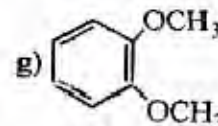
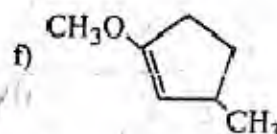
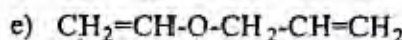
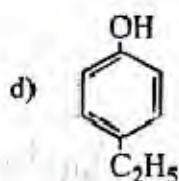
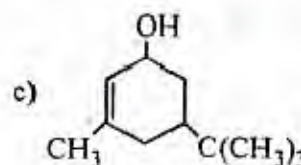
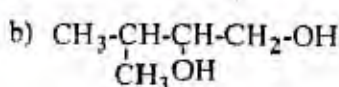
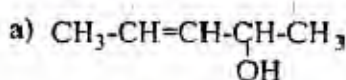
LES GROUPES FONCTIONNELS (1)

I. Donner le nom systématique des composés suivants :



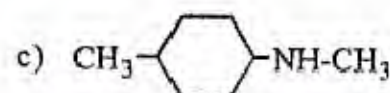
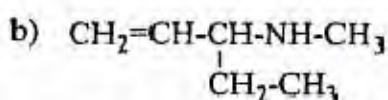
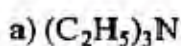
II. 1°). Ecrire et nommer les alcools et éthers de formule brute $\text{C}_4\text{H}_{10}\text{O}$

2°) Nommer les composés suivants :



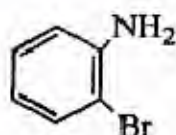
III- 1°) Ecrire et nommer toutes les amines de formule brute $\text{C}_4\text{H}_{11}\text{N}$.

2°) Nommer les composés suivants :

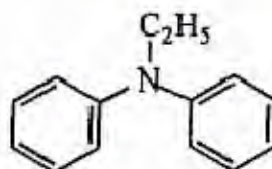


3°) a- Une amine aromatique a pour formule moléculaire $\text{C}_8\text{H}_{11}\text{N}$. Ecrire et nommer toutes les structures possibles.

b- Nommer les composés :



et



IV- 1°) L'analyse d'une substance organique a montré que sa molécule contient une fonction aldéhyde et une double liaison $\text{C}=\text{C}$; sa masse moléculaire est $M=70\text{g}\cdot\text{mol}^{-1}$.

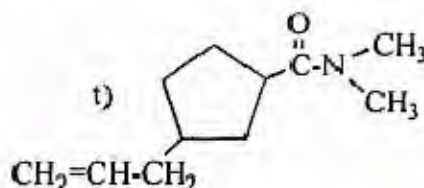
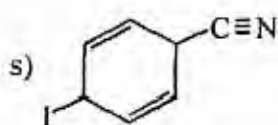
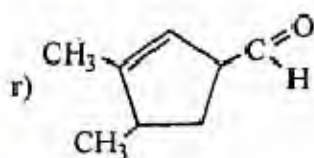
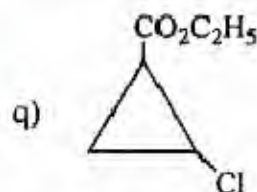
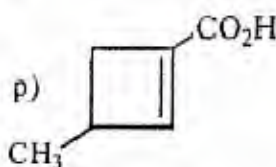
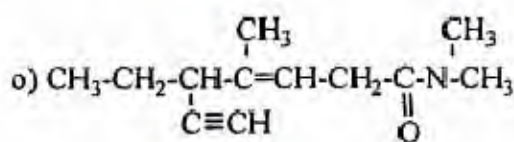
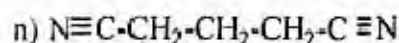
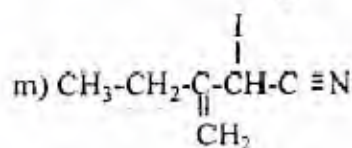
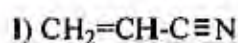
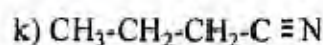
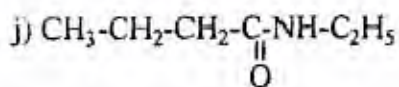
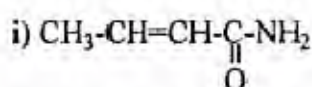
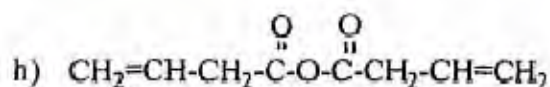
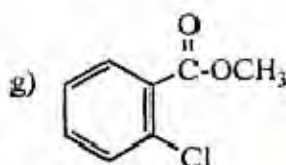
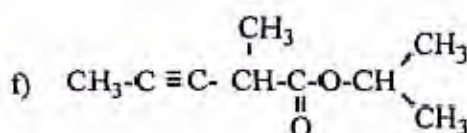
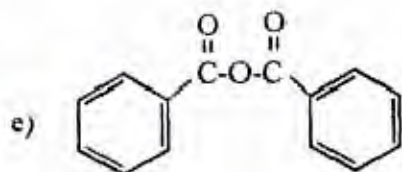
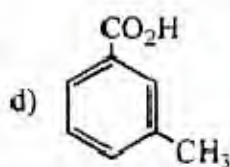
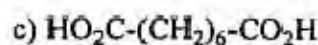
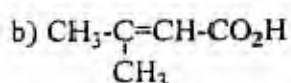
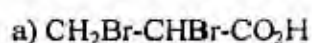
a- Donner la formule brute de ce composé.

b- Ecrire et nommer les formules développées possibles.

2°) Donner les formules développées et les noms des aldéhydes et cétones de formule brute C_4H_8O .

V- 1°) Donner et nommer tous les acides carboxyliques et esters de formule brute $C_4H_8O_2$.

2°) Nommer les composés :

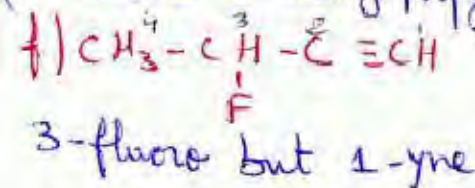
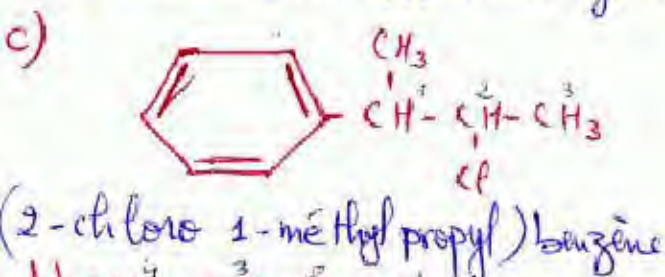
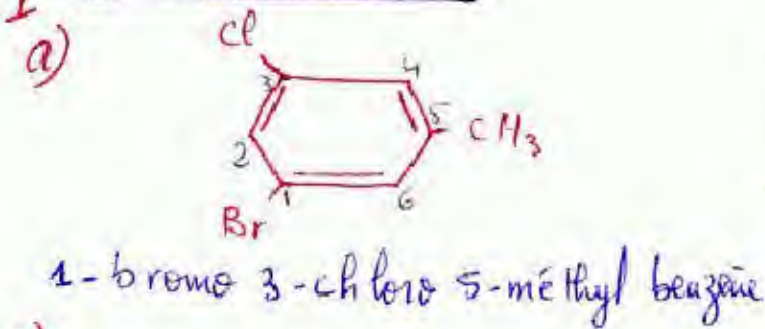


3°). a). Un acide carboxylique A réagit avec un composé organique B pour donner le composé C suivant : 4-isobutyl 2-méthyl hex 3-èn 5-yn oate d'isopropyle.
Donner la structure de A, B et C, le nom de A et B, et écrire la réaction chimique.

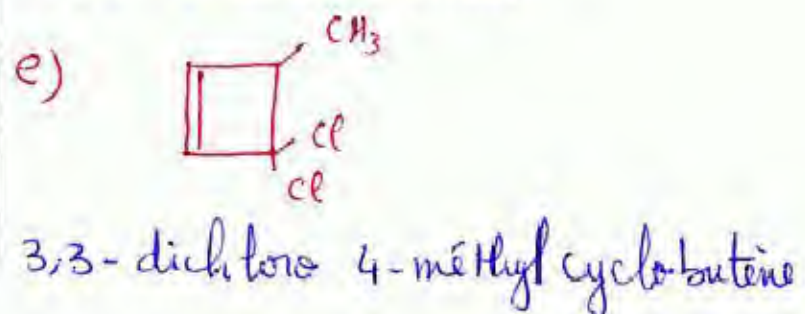
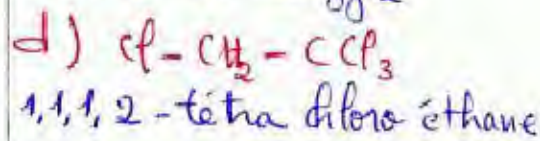
b). Le même acide A réagit avec la N-méthyl éthanamine D pour donner un composé E.
Donner la structure de D et E, le nom de E, et écrire la réaction chimique.

c). Que donnerait le même acide A en présence d'un agent déshydratant ? Donner la structure et le nom du composé F obtenu, et écrire la réaction chimique.

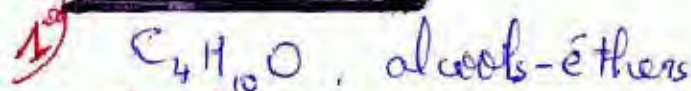
I) Exercice 1:



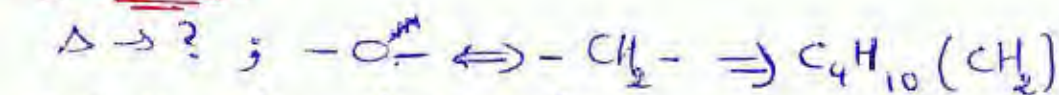
- bromo méthyl benzène
- brome de benzyle



Exercice 2:



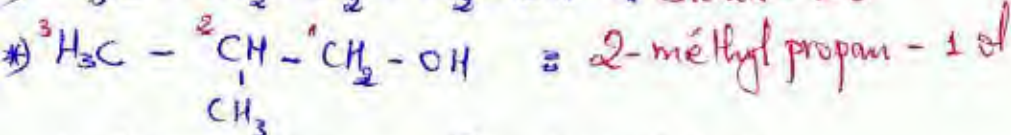
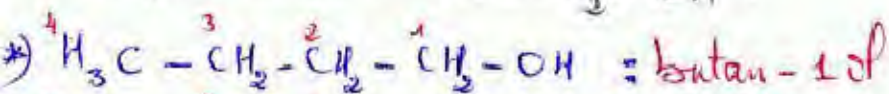
* Alcool:



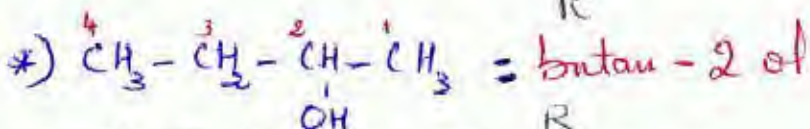
$\Rightarrow \text{C}_5\text{H}_{12}$ = formule d'un alcane.

$\Rightarrow \Delta = 0 \Rightarrow$ pas des liaisons simples et aucun cycle.

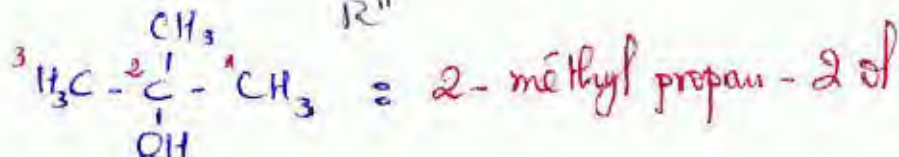
1-1) primaires : $\text{R}-\text{CH}_2-\text{OH}$:



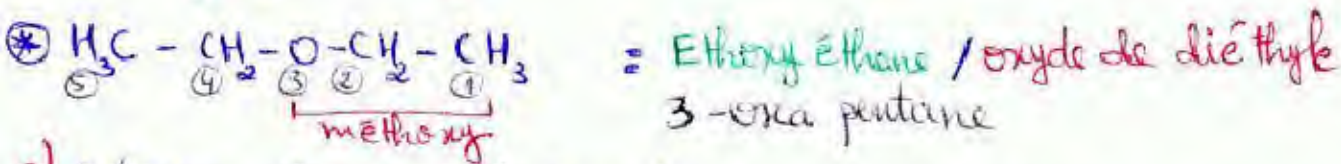
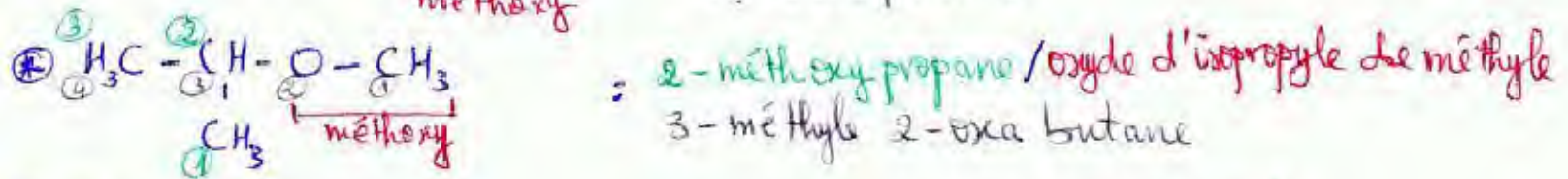
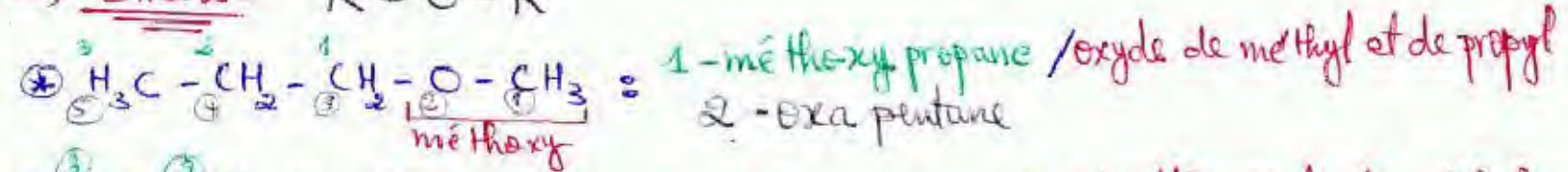
1-2) Secondaires : $\text{R}-\underset{\text{R}'}{\text{CH}}-\text{OH}$:



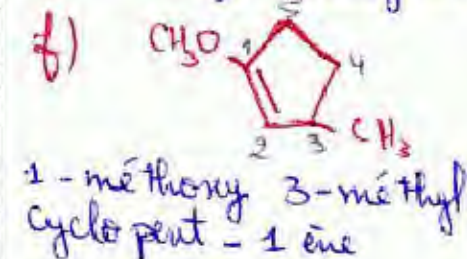
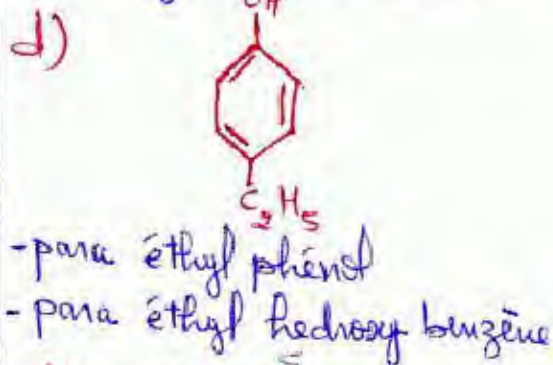
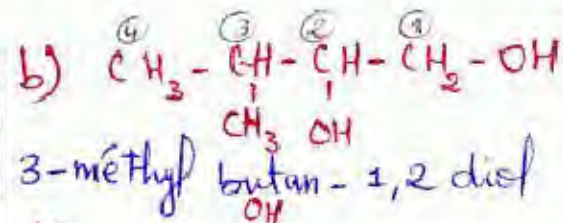
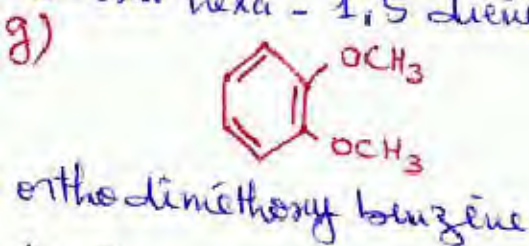
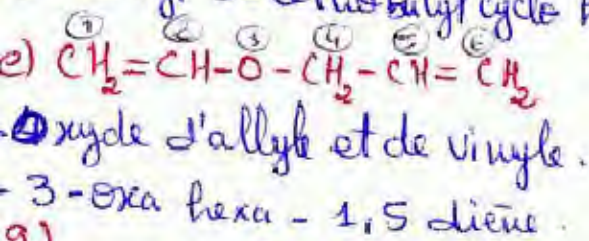
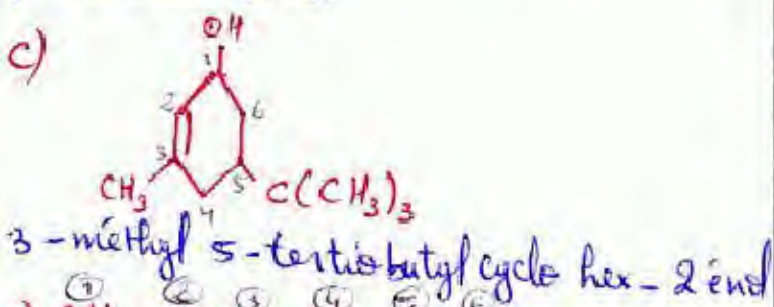
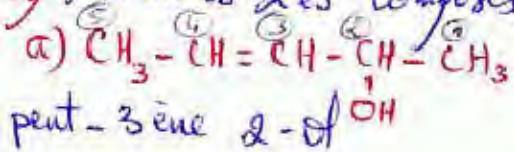
1-3) Tertiaires : $\text{R}'-\underset{\text{R}''}{\underset{\text{R}}{\text{C}}}-\text{OH}$:



* Ethers: $R-O-R'$



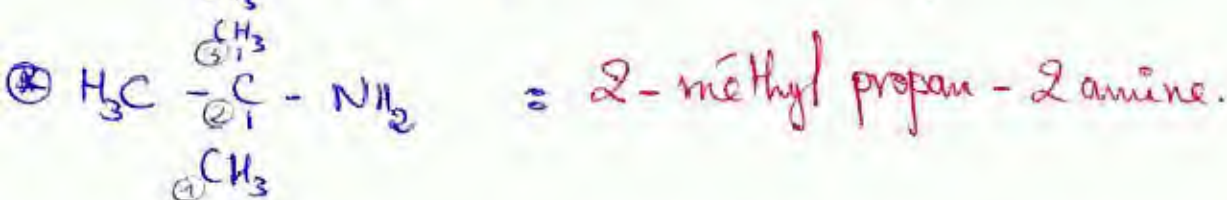
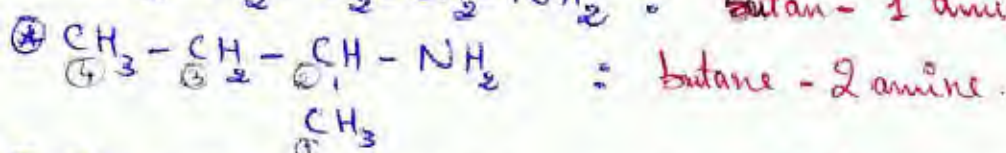
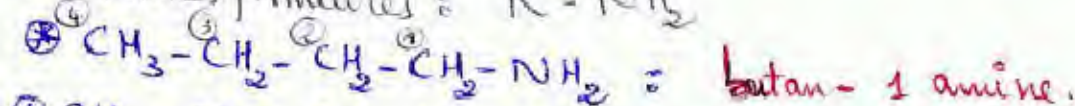
2) Nommes les composés suivants :



Exercice 3: $\text{C}_4\text{H}_{11}\text{N}$: amines :

$\Delta = ?$; $-\text{N}' \leftrightarrow -\text{CH}' \Rightarrow \text{C}_4\text{H}_{11}(\text{CH})$ / $\Delta = \frac{1}{2} (2x + 2 - y + z - v)$
 $\Rightarrow \text{C}_5\text{H}_{12} \Rightarrow \Delta = 0$ (Alcane) / $= \frac{1}{2} (2 \times 4 + 2 - 11 + 1) = 0$

* Amines primaires : $\text{R}-\text{NH}_2$



➤ Suite d'exercice 3 :

1) Amines Secondaires : $R-NH-R'$

② $\overset{3}{CH_3}-\overset{2}{CH_2}-\overset{1}{CH_2}-NH-CH_3$: N-méthyl propan-1 amine.

③ $\overset{3}{H_3C}-\overset{2}{CH}-NH-CH_3$: N-méthyl propane-2 amine.
 $\overset{1}{CH_3}$

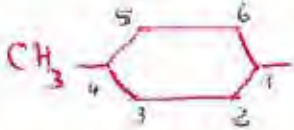
④ $CH_3-CH_2-NH-CH_2-CH_3$: N-éthyl éthanamine.

* Amines tertiaires : $R-N(R')-R''$

$H_3C-CH_2-\overset{CH_3}{N}-CH_3$: N,N-diméthyl éthanamine.

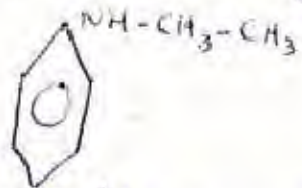
2) a : $C_2H_5-N(C_2H_5)_2$: N,N-diéthyl éthanamine
 triéthyl amine

b : $CH_2=CH-\underset{CH_2-CH_3}{CH}-NH-CH_3$: N-méthyl pentène 3-amine.

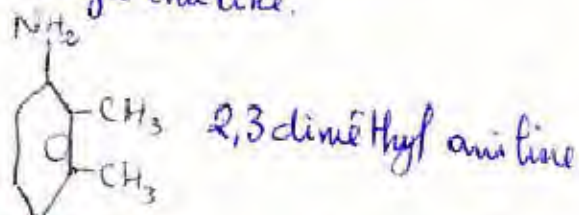
c :  : N-méthyl 4-méthyl cyclohexane 1-amine

3) a : $C_8H_{11}N$

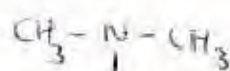
$\Delta = 4$: Le degré de saturation :



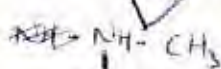
N-éthyl benzène amine
 N-éthyl aniline.



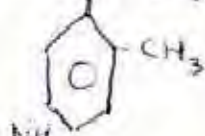
2,3 diméthyl aniline



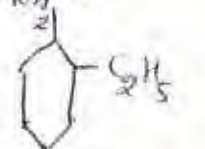
N,N diméthyl benzène amine
 N,N-diméthyl aniline



ortho méthyl N-méthyl aniline

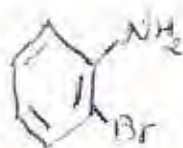


ortho éthyl aniline

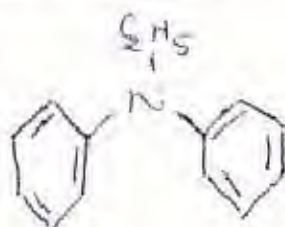


N-éthyl N-phényl
 aniline

b) Nommer les composés :



ortho bromo aniline



➤ Exercice 4 :

1) a) $M = 70 \text{ g/mol}$; le composé contient

- un aldéhyde $\text{-C}(=\text{O})\text{-H}$
- une double liaison $\text{C}=\text{C}$

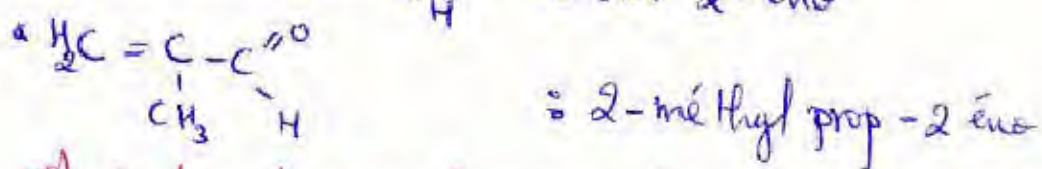
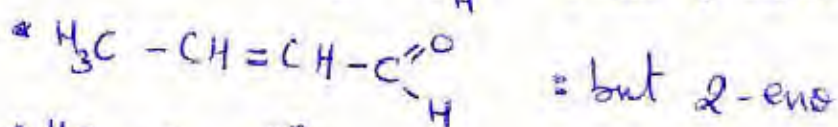
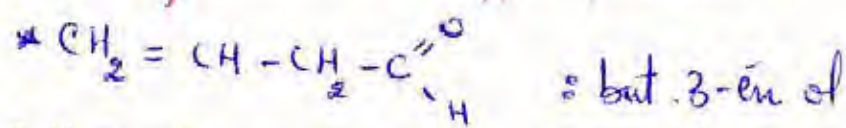
$$M(A) = M(\text{OH}) + M(\text{C}=\text{C}) + M(\text{C}) + M(\text{H}) \Rightarrow M(\text{H}) = 70 - (16 + 24 + 1 + 12) = 17$$

C'est donc $1\text{C} + 5\text{H}$.

Donc la formule brute du composé est : $\text{C}_4\text{H}_6\text{O}$.

$$D = 2.$$

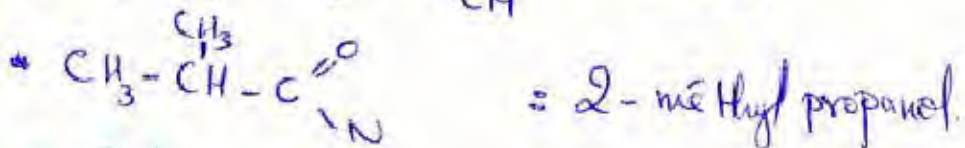
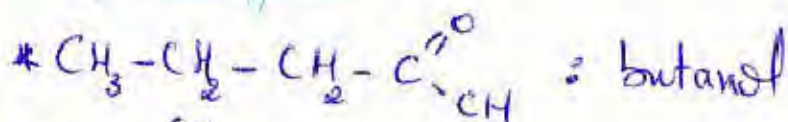
b) les formules développées possibles :



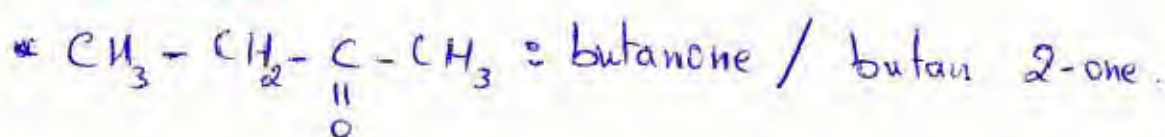
2) Les formules développées et les noms des aldéhydes et cétones de formule brute $\text{C}_4\text{H}_8\text{O}$:

$$D = \frac{1}{2} (8 - (8) + 2) = 1$$

* Aldéhydes :



* Cétones :

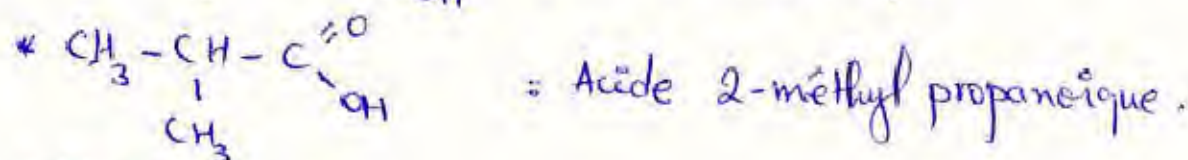
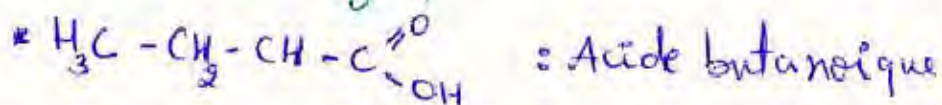


➤ Exercice 5 (suite TD n° 2)

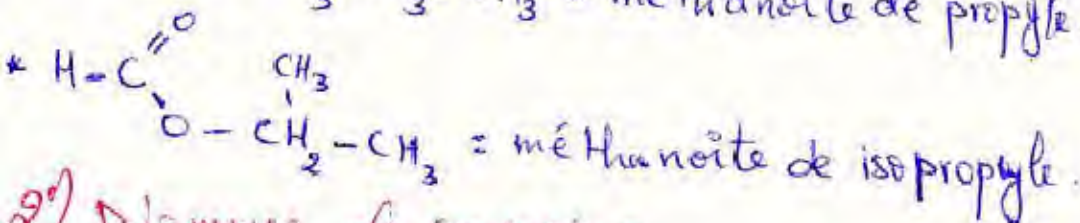
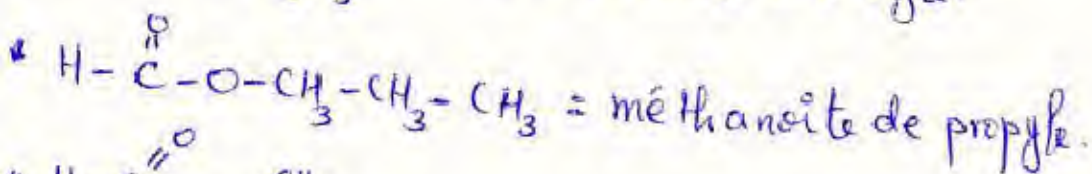
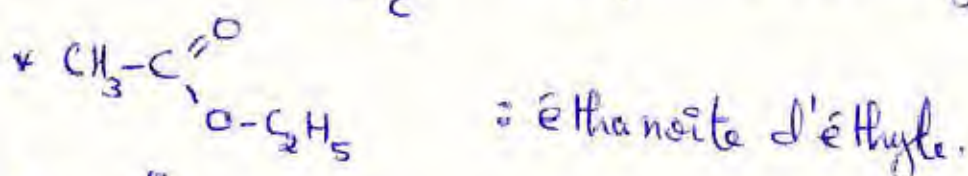
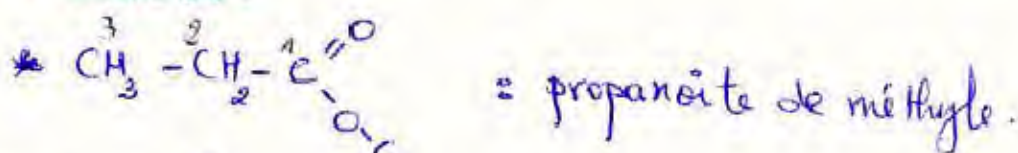
1°) $C_4H_8O_2$:

$$\Delta = \frac{1}{2} (8 + 2 - (8)) = 1$$

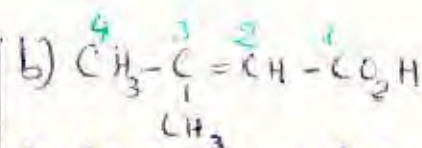
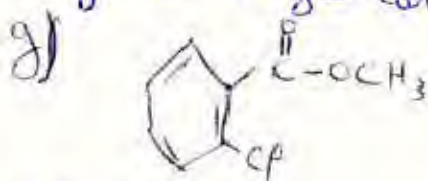
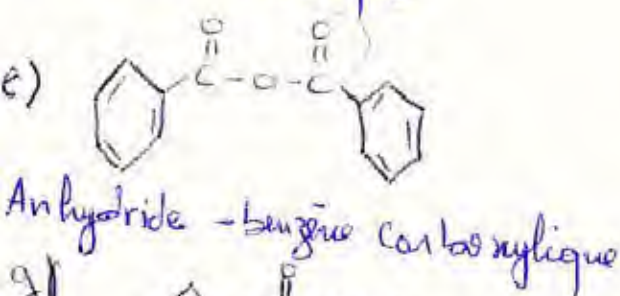
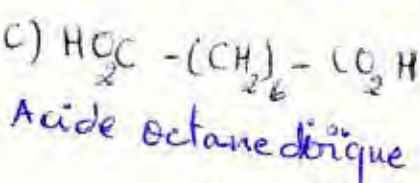
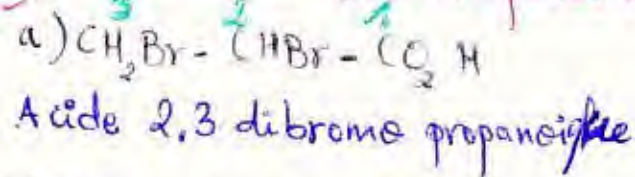
* Acide Carboxylique:



* Estères:



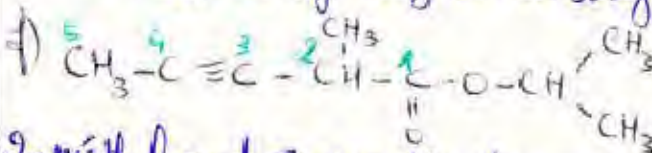
2°) Nommer les composés:



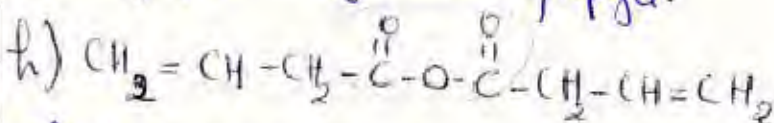
Acide 3-méthylbut-2-énoïque.



Acide ~~meta~~-méthylbenzoïque carboxylique



2-méthylpent-3-ynoate d'isopropyle.



anhydride but-3-énoïque.

